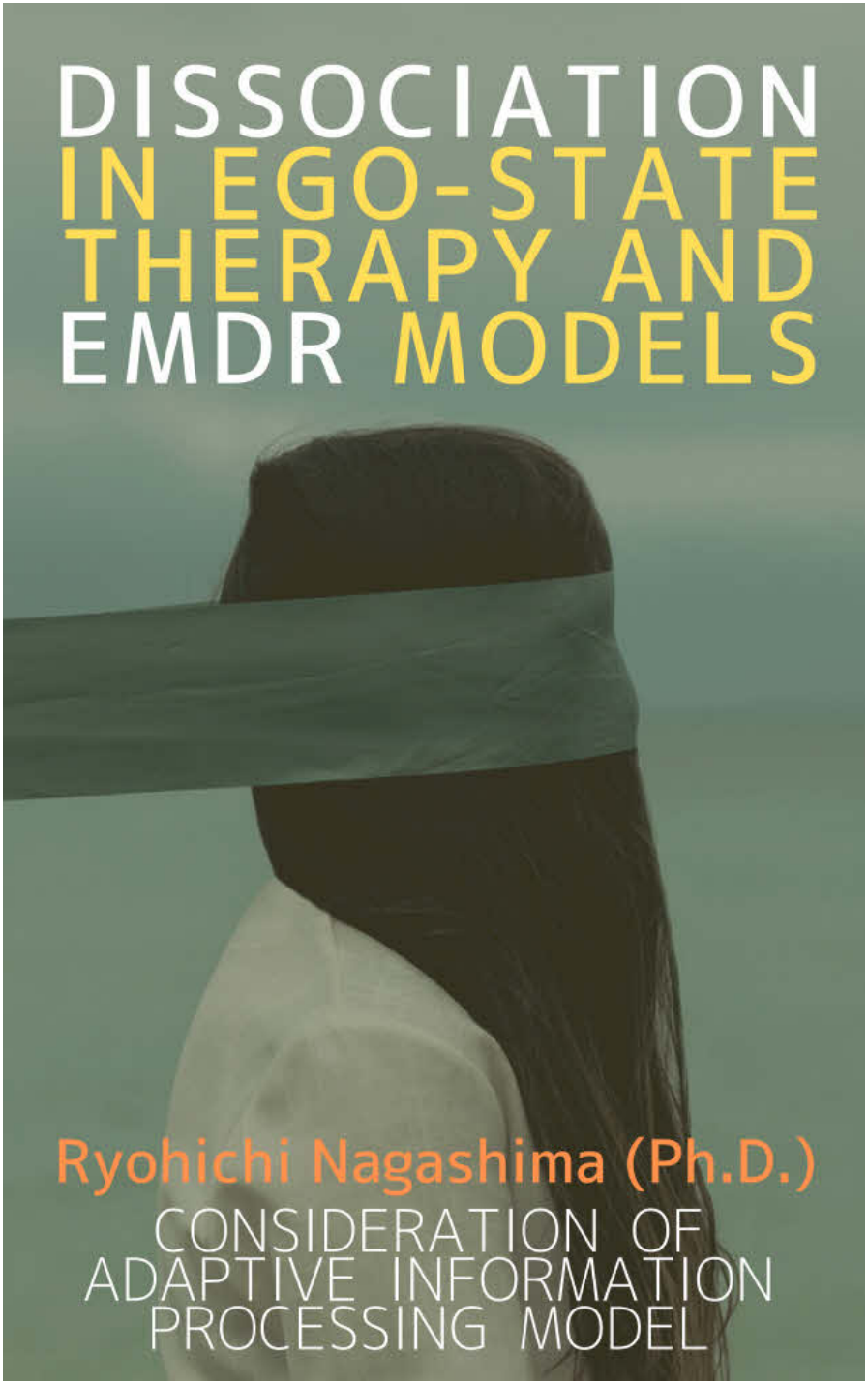
DISSOCIATION IN EGO-STATE THERAPY AND EMDR MODELS



Ryohichi Nagashima (Ph.D.)

CONSIDERATION OF ADAPTIVE INFORMATION PROCESSING MODEL

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PREFACE

EMDR (Eye Movement Desensitization and Reprocessing) is an effective psychotherapy for PTSD(posttraumatic stress disorder).

Simply put, it will be the following therapy.

The therapist puts a finger in front of the client's eyes and slowly moves it to the left and right with a constant rhythm.

The client performs eye movement that catches the movement of the finger with both eyes in a state of recalling unpleasant memories that he or she does not want to notice.

Basically, eye movement does not matter in any way as long as it moves the eyes left and right.

Also, there is no need to use a finger as an indicator.

For example, it can be implemented using the left and right movement of the light spot displayed on the display of a personal computer or something like that.

And it has been reported that not only eye movements on the left and right but also eye movements on the top and bottom are effective.

Furthermore, it is said that it is effective not only in eye movement but also in bilateral stimulation such as generating tapping sound alternately to the left and right.

And by such eye movement and tapping sound, the unpleasant memories recalled by clients gradually fade away.

I have also been treated with EMDR, but after performing eye movements, the unpleasant memories that I had in my head were wrapped up in something like oblate or something like haze.

And although the memory of the matter itself is clearly left in my brain, I felt that the rejection of the matter was clearly thinner than before the therapy was performed.

At present, EMDR has been widely applied not only to PTSD (posttraumatic stress disorder) but also to treatment of DID (dissociative identity disorder:multiple personality) , truancy (school refusa), preventing recidivism among juvenile delinquents and so forth.

Several models have been proposed as to why such effects can be obtained by using EMDR.

However, which model is valid has not been scientifically proven yet.

This book focuses on four models currently considered to be the mechanism of action of EMDR, and discusses the possibilities of the mechanism of action.

It would be appreciated if the insights in this book could be helpful not only to EMDR researchers and those involved in psychology, but also to all modern people who are exposed to a lot of mental stresses.

Than you.

Ryohichi Nagashima (Ph.D.)

1. Mechanism of action models on EMDR

At present, the following four models are mainly proposed as the mechanism of action on EMDR.

(1) AIP (Adaptive Information Processing model)

PTSD disrupts the network of adaptive processing of memory.

And defense mechanism does not let the memory become conscious.

However, when a context-specific stimulus is applied, the responsive processing network is activated.

That is, AIP has a mechanism in which information processing (stopping non-adaptive information processing and putting on a memory reprocessing process) leading to adaptive solution is promoted by two-sided stimulation.

(2) Working memory model

The capacity of each of central executive, visuospatial sketchpad, phonological loop and episodic buffer is limited.

Bilateral stimulation interferes with the ability to hold them originally by adding new images and information such as emotions and physical sensations.

This diminishes the sense of each function.

(3) Cerebral hemisphere interaction model

With the same level of activity in the left and right cerebral hemispheres, the signal transduction in the cerebral hemispheres is activated and memory can be recalled more accurately.

The working memory model focuses on changes in the amount of information processing, while this model focuses on the accuracy of the search for memory.

(4) Search reflection model

Search reflection is triggered when rapid eye movement confirms that the surrounding environment is no longer threatened.

As a result, negative memories and positive physical sensations are presented in pairs.

In addition, the level of physiological arousal is lowered and negative emotions are removed.

Here, the experimental research results of the working memory model, the Cerebral hemisphere interaction model and the Search reflection model are summarized in the following table.

The adaptive information processing model (AIP) will be discussed separately.

By "Experimental study on the influence of eye movement on memory recall", Yoshikawa and Ichii, EMDR study, 3, 26-29, (2011).

Factors that affirm each model are shown in pink, and factors that are denied are shown in light blue.

comparison of the EMDR models

"Experimental study on the influence of eye movement on memory recall", Yoshikawa and Ichii, EMDR study, 3, 26-29, 2011.

Pink: positive result, consideration Blue: negative result, consideration

model	content	Experimental research results	
Adaptive Information Processing model	Context-specific stimuli activate networks of adaptive processing.		
Working memory model	Bilateral stimulation leads to diminished sensation due to the reduced ability of central executive, visuospatial sketchpad, and phonological loop and episodic buffers.	Memory in the laboratory	Eye movement has been shown to reduce memory clarity, but experiments have shown inconsistent results for unpleasant emotional changes. It was only kept for a short time, and the degree of personal involvement varied.
		Autobiographical memory	Eye movement was shown to reduce positive and negative memory sharpness and emotional intensity.
		Future painful image created by the subject himself/herself	Eye movement has been shown to affect sharpness and emotional intensity.
		The greater the load on the working memory, the lower the sharpness.	
		The effect of eye movement was not related to the working memory capacity.The amount of loading to be effective does not depend on the relationship between the amount of stimulation and the storage capacity.	
		As for the regional specificity of eye movement, the results are inconsistent, which also affects the visuospatial sketchpad and also affects the visuospatial sketchpad and the phonological loop.	
		The sense modality that working memory can handle is only sight and hearing.Tapping can not be handled, which needs to explore a new explanatory model.	
		With regard to the duration of the effect of eye movement, the loss of sharpness due to eye movement is not maintained.The results do not agree on the maintenance of emotional strength.	

Pink: positive result, consideration Blue: negative result, consideration

model	content	Experimental research results	
Cerebral hemisphere interaction model	With the same level of activity in the left and right cerebral hemispheres, communication between the cerebral hemispheres is activated and memory can be more accurately early.	Memory in the laboratory	If the test is performed immediately after horizontal eye movement, recognition results are good in the learning process.It did not affect latent memory.
		Autobiographical memory	Horizontal eye movement has been found to improve recall accuracy and to relive autobiographical memories more strongly.
		It is unclear whether the above results are mediated by the interaction of the left and right cerebral hemispheres.It is necessary to measure brain activity in the future.	
Search reflectio	When it is confirmed by the rapid eye movement that there is no threat to the surrounding environment, negative emotions are removed.	Eye movement has been shown to cause changes in physiological state during memory recall.However, it did not agree whether the influence was going to increase awakening or to suppress.	
		In experiments using brain waves and NIRS, eye movement stabilizes responses to emotional stimuli.However, there are variations in the number of eye movement exercises. When the number of sets is large, physiological changes tend to be suppressed, but the results are not consistent in the practice of only one set.	

2. Dissociation and EMDR in ego-state therapy

Ego-State Therapy is a technique developed by Watkins & Watkins (1979, 1997), which adds hypnosis to the concept of an ego-state model.

During EMDR, ego-states that were previously internally divided may appear spontaneously.

In other words, dissociation of personality may occur (Phillips, 2000).

This is shown in the next figure.

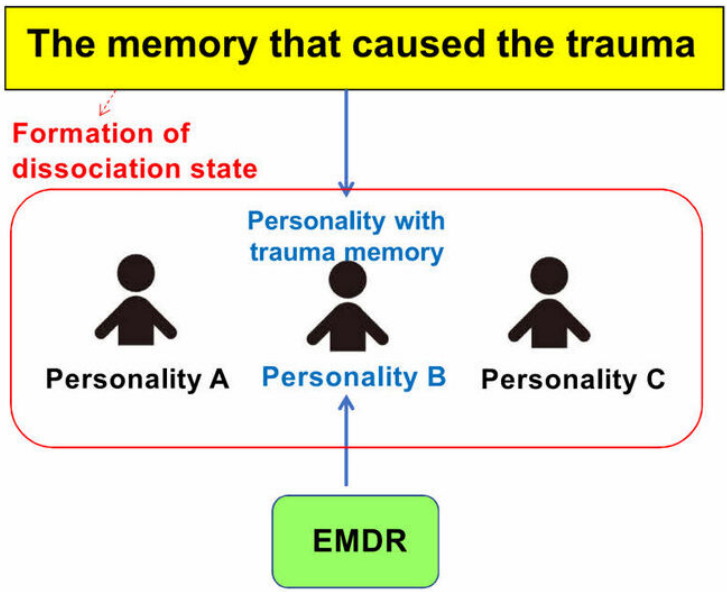
The traumatic memory forms a dissociative state of personality, which is assumed to be personality A, personality B, personality C.

Here, only personality B is a personality with traumatic memory.

If the three dissociated characters appear during EMDR therapy, it has been found that performing EMDR on personality B with traumatic memory has the effect of diminishing traumatic memory.

Taking the dissociative phenomenon in this ego-state therapy as an example, I would like to verify the validity of each model next.

Dissociation phenomenon in ego-state therapy

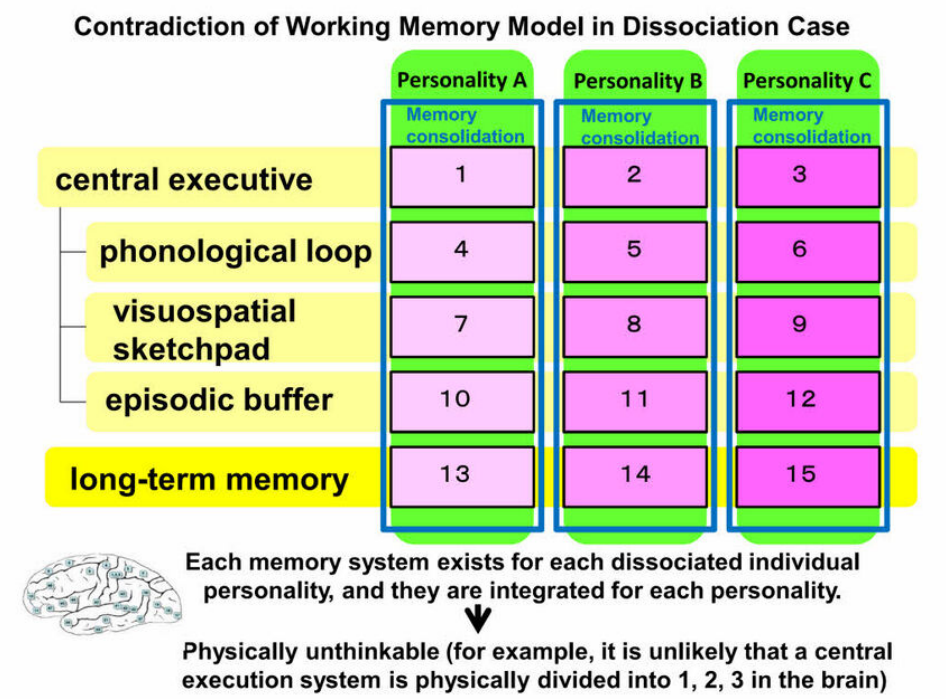


3. Consideration of working memory model

As described before, the content of the Working memory model is the folloeing.

The capacity of each of central executive, visuospatial sketchpad, phonological loop and episodic buffer is limited.
Bilateral stimulation interferes with the ability to hold them originally by adding new images and information such as emotions and physical sensations.
This diminishes the sense of each function.

When trying to explain the effect of EMDR on the dissociation phenomenon in ego-state therapy by the working memory model, contradiction as shown in the following figure will occur.



That is, the central executive, the visuospatial sketchpad, the phonological loop, the episodic buffer and the long-term memory individually exist individually for each personality, and they are integrated in each personality unit.

As shown by the effect of EMDR on the dissociation of egostate therapy, if only personality B has the trauma memory, then only traumatic memory of personality B must exist independently in the brain, that is in the central executive, the visuospatial sketchpad, the phonological loop, the episodic buffer and the long-term memory.

However,for example, the central execution system is physically an

independent single site in the brain.

That is, the central execution system of personality A, the central execution system of personality B, and the central execution system of personality C cannot exist independently in the brain.

Bacause of this reason, the working memory model cannot explain the effect of EMDR on the dissociation of ego-state therapy.

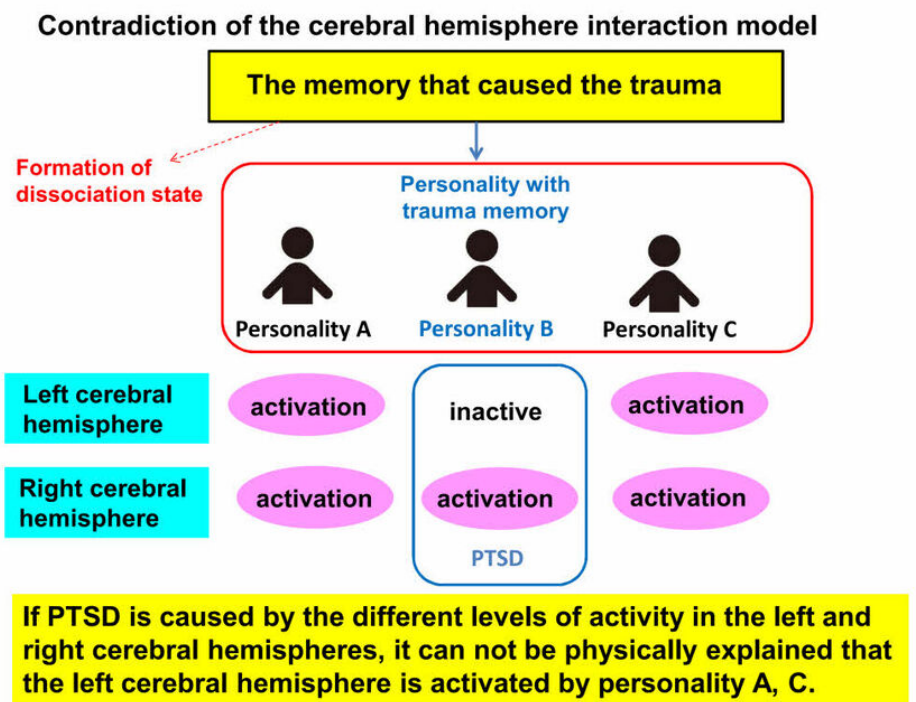
4. Consideration of Cerebral hemisphere interaction model

The cerebral hemisphere interaction model is outlined below.

With the same level of activity in the left and right cerebral hemispheres, signal transduction in the cerebral hemispheres is activated, and memory can be recalled more accurately.

The working memory model focuses on changes in the amount of information processing, while the cerebral hemisphere interaction model focuses on the accuracy of the search for memory.

Also about this model, let us consider whether the effect of EMDR on the dissociation phenomenon in ego-state therapy can be explained using the following figure.


Contradiction of the cerebral hemisphere interaction model
The memory that caused the trauma
Formation of dissociation state
Personality with trauma memory
Personality A
Personality B
Personality C
Left cerebral hemisphere
Right cerebral hemisphere
activation
inactive
activation
activation
activation
activation
PTSD
If PTSD is caused by the different levels of activity in the left and right cerebral hemispheres, it can not be physically explained that the left cerebral hemisphere is activated by personality A, C.

If only dissociated personality B has traumatic memory, only personality B will be in an inactive state in either of the left or right cerebral hemispheres.

Conversely, non-traumatic personalities A and C must have both cerebral hemispheres activated.

However, physically the left and right cerebral hemispheres are integrated entities.

For example, as shown in the above figure, it is impossible that only the portion corresponding to the left cerebral hemisphere of the personality B is inactive.

From the above consideration, it is clear that the cerebral hemisphere

interaction model cannot explain the effect of EMDR on the dissociation phenomenon in ego-state therapy.

5. Consideration of Search reflection model

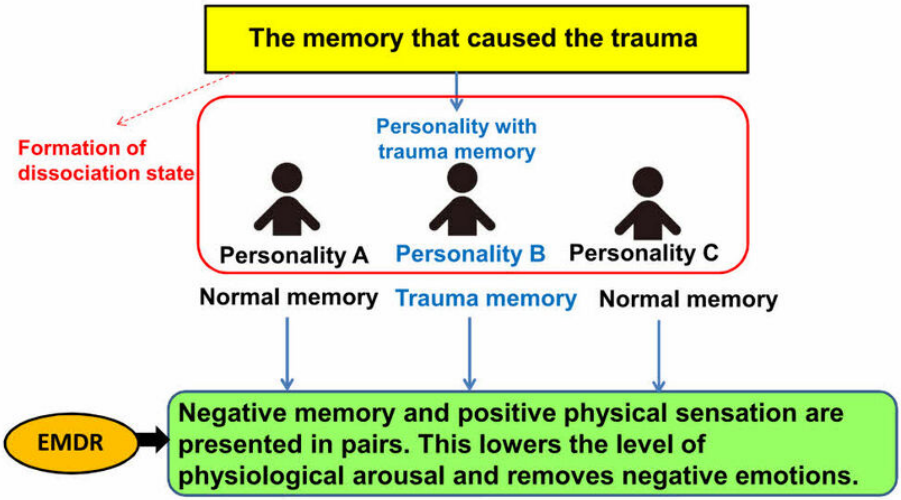
The outline of the search reflection model is as follows.

When it is confirmed that there is no threat to the surrounding environment by the rapid eye movement, the exploratory reflection reaction is triggered and the negative memory and the positive physical sensation are presented as a pair.
This lowers the level of physiological arousal and the negative emotions are removed.

Also in this model, let us consider whether it can explain the effect of EMDR on the dissociative phenomenon in ego-state therapy.
The contents of the discussion are shown in the next figure.

As apparent from the above figure, using EMDR, It is possible that "The negative memory and the positive physical sense are presented as a pair. And this can lower the level of physiological arousal and remove negative emotions.".
That is, the search reflection model can explain the effect of EMDR on the dissociation phenomenon in ego-state therapy.

Search reflection model in the dissociation state


The memory that caused the trauma
Formation of dissociation state
Personality with trauma memory
Personality A
Personality B
Personality C
Normal memory
Trauma memory
Normal memory
EMDR
Negative memory and positive physical sensation are presented in pairs. This lowers the level of physiological arousal and removes negative emotions.

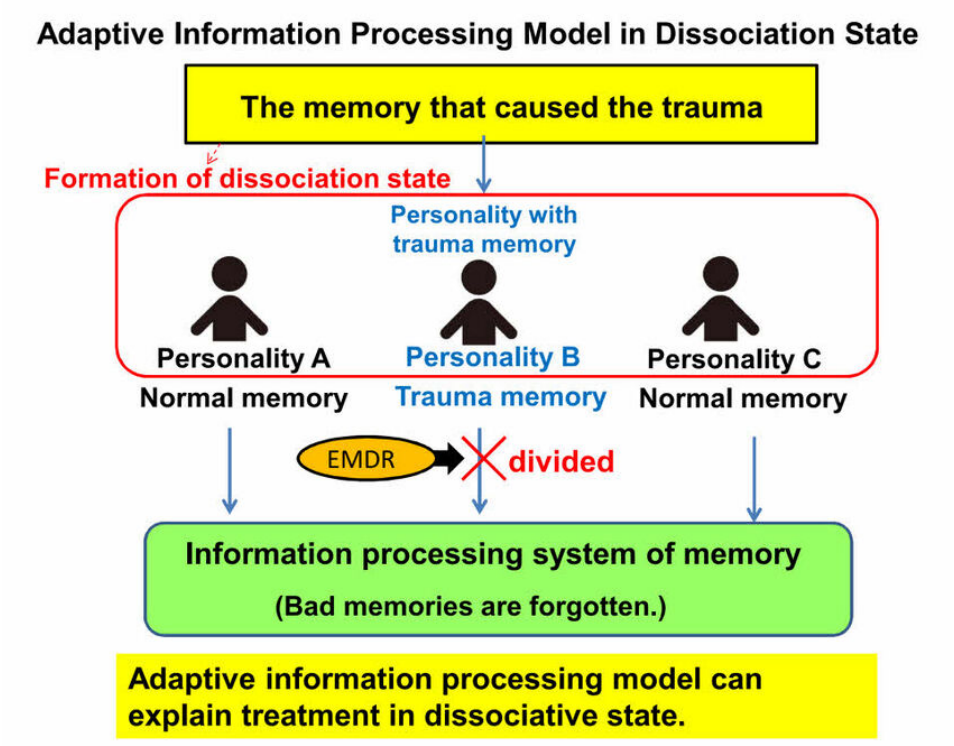
Search reflection model can explain treatment in dissociative state.

6. Consideration of AIP (Adaptive Information Processing model)

The outline of the adaptive information processing model (AIP) is as follows.

The PTSD disrupts the network of adaptive processing of memory, and defense mechanisms keep it from becoming conscious.
However, adaptive processing networks are activated when context-specific stimuli are applied.
That is, the bilateral stimulation promotes information processing that leads to an adaptive solution by stopping non-adaptive information processing and putting infoemation in a memory reprocessing process.

Also in this model, let us consider whether it can explain the effect of EMDR on the dissociative phenomenon in ego-state therapy.
The contents of the discussion are shown in the next figure.



From the figure, that only personality B has trauma memory means that the information processing system of personality B's trauma memory and memory is divided.

In other words, it can be understood that this division is improved by treating the personality B with EMDR, and it is possible to forget bad memories by the memory information processing system.

That is, it can be said that it is possible to explain the effect of EMDR on the dissociation phenomenon in ego-state therapy by Adaptive Information Processing Model (AIP).

7. Summary of consideration

As described above, each of the four models has been considered as "whether it is possible to explain the effect of EMDR on the dissociative phenomenon in ego-state therapy".

Here, the results of the study are summarized as shown in the following table.

Model Verification Based on Dissociation in Ego State Model

model	Explanation of "the mechanism of action" of EMDR
Adaptive Information Processing model (AIP)	possible
working memory model	impossible
cerebral hemisphere interaction model	impossible
search reflection model	possible

This model cannot explain the effect of EMDR without using eye movement.

Adaptive Information Processing model is dominant.

In the discussion, the adaptive information processing model (AIP) and the search reflection model can be explained the fact as "the effect of EMDR on the dissociative phenomenon in ego-state therapy", but the working memory model and the cerebral hemisphere interaction model can not be explained.

However, the search reflection model states that “If it can be confirmed by the rapid eye movement that the surrounding environment is no longer threatened, the exploratory reflection reaction is triggered and the negative memory and the positive physical sensation are presented as a pair. This lowers the level of physiological arousal and the negative emotions are removed."

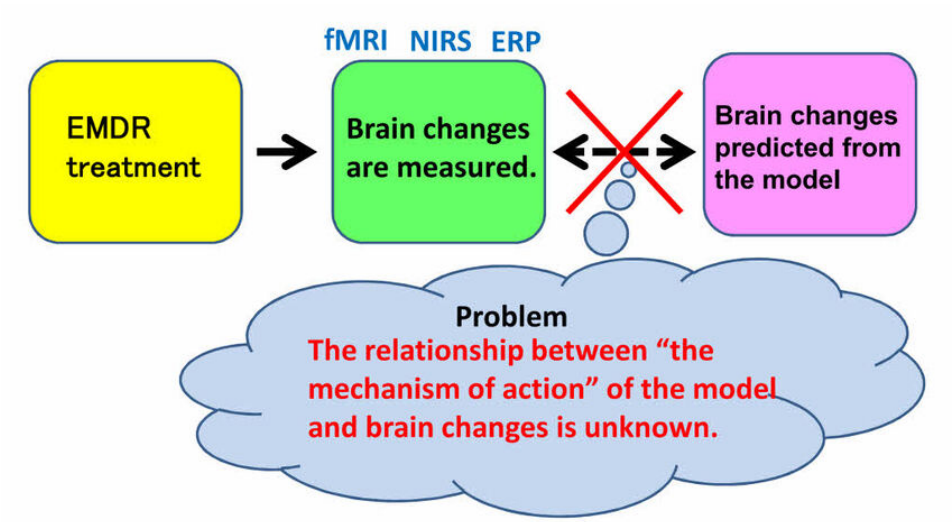
That is, with this model, it can not be explained that even left and right alternate tapping sounds that are completely different from alternate eye movement are effective.

From the above, it can be said that the adaptive information processing model (AIP) is the most powerful model as the action mechanism of EMDR.

8. Demonstration of model effects

Next, let's consider how to demonstrate the effects of the model.

The conventional problem is that, as shown in the following figure, when EMDR was performed and some canges in the brain were measured, scientific verification of the model could not be performed, because the relationship between the changes in the brain and "the mechanism of action" of the model is unknown.

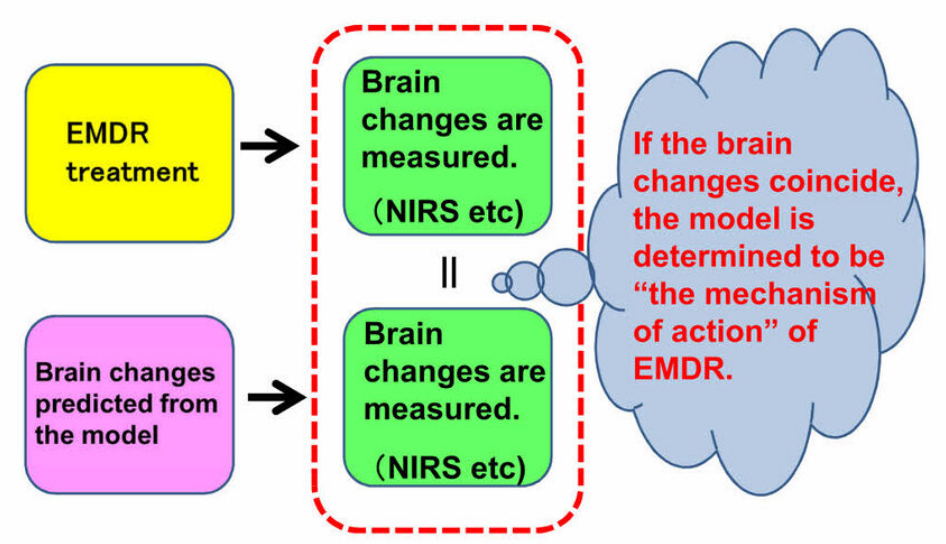

fMRI NIRS ERP
EMDR treatment
Brain changes are measured.
Brain changes predicted from the model
Problem
The relationship between “the mechanism of action” of the model and brain changes is unknown.

To solve this task, it may be a best way to compare the changes in the brain when EMDR is performed with the changes in the brain predicted

by "the mechanism of action" of the model.

And if those changes are the same, it seems effective to consider the model as "the mechanism of action" of EMDR.

This relationship is shown in the next figure.


EMDR treatment
Brain changes predicted from the model
Brain changes are measured. (NIRS etc)
=
Brain changes are measured. (NIRS etc)
If the brain changes coincide, the model is determined to be "the mechanism of action" of EMDR.

Also, a specific method will be shown below, taking the adaptive information processing model and the working memory model as an example.

Adaptive Information Processing model

1. Treat EMDR to PTSD patients and measure brain changes before and after treatment with NIRS etc.

2. Ask subjects who are not PTSD patients to recall recent negative memories and measure brain changes using NIRS etc.

3. Measure the change in the brain at the time when the unpleasant memory fades naturally.

4. The difference in brain changes is the mechanism of adaptive information processing model.

5. If the above 1 and 4 match, it is judged that the adaptive information processing model can be applied.

Working memory model

1. Treat EMDR to PTSD patients and measure brain changes before and after treatment with NIRS etc.

2. Undergraduate students who are not PTSD patients are asked to perform simple 2-digit multiplication by mental calculation, and measure blood flow in the brain by NIRS etc. The phonological loop and the central executive are used at this time.

3 Next, perform the numbering and measure with NIRS etc. The phonological loop is used at this time, and the difference between the two is determined as the central executive mechanism.

4. Make brain changes in central executive the mechanism of working memory model.

5. If the above 1 and 4 match, it is judged that the working memory model can be applied.

9. Conclusion

As described above, each of the four models was considered as "whether it is possible to explain the effect of EMDR on the dissociative phenomenon in ego-state therapy".

As a result, it became clear that the adaptive information processing model (AIP) is the leading candidates for the action mechanism of EMDR.

Furthermore, specific methods for scientifically validating the mechanism of action were presented.

It would be good if the insights in this book could be helpful not only to EMDR researchers and those involved in psychology, but also to all modern people who are exposed to the various mental stresses.

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